

Low Profile Dual Band WiFi Chip Antenna



ACAR0301-SW2



3.05 x 1.60 x 0.55 mm
RoHS/RoHS II Compliant
MSL = 1

Features

- Dual band WiFi 2.4 GHz/5.5 GHz
- Low profile
- Gain of 1.0/2.5 dBi
- Omnidirectional pattern
- Low VSWR of 2.0

Applications

- WiFi
- Bluetooth
- ISM
- Wearables
- IoT
- AR/VR
- Drones
- Broadband connectivity

Electrical Characteristics

| Item | Spec* | | Comments |
|--------------------------|--------------|--------------|----------------------------|
| Working Frequency | 2400~2500MHz | 5150~5825MHz | Dual 2.4GHz and 5GHz bands |
| VSWR | 2:1 | 2:1 | |
| Peak Gain (2400~2500MHz) | Typ 1.0 dBi | Typ 2.5 dBi | |
| Efficiency | 75% | 80% | |
| Polarization | Linear | | |
| Impedance | 50 Ω | | |
| Operating Temperature | -40°C ~ 85°C | | |
| Storage Temperature | -40°C ~ 85°C | | |

* Data collected per Table on standard evaluation board, and under the environmental conditions of +40°C and 0-95% relative humidity.

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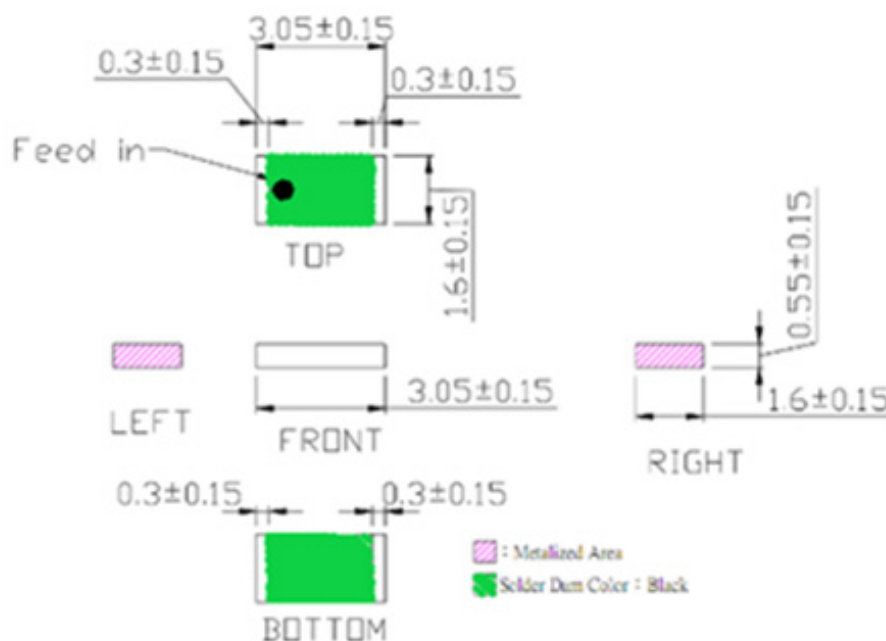


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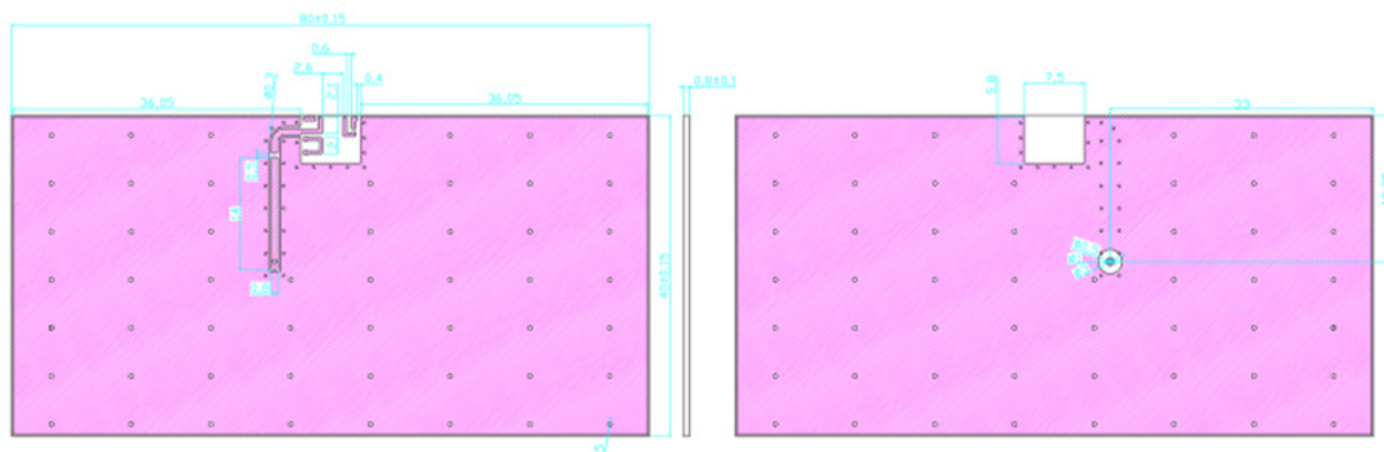
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Dimensions



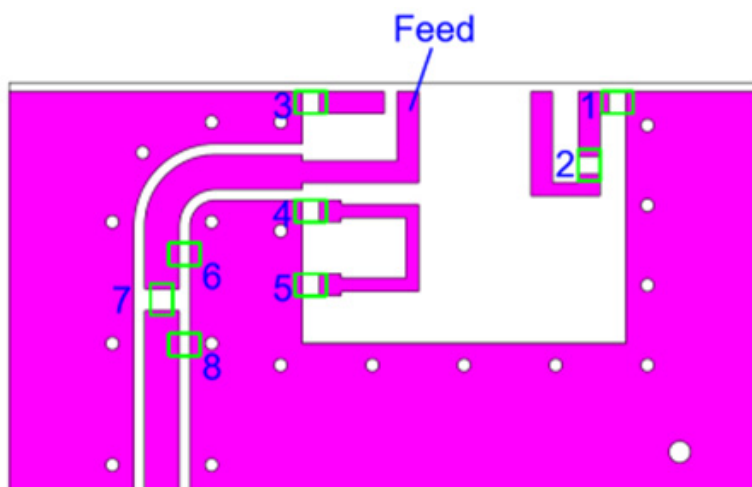
Dimensions (mm)

Evaluation Board and Dimensions





Recommended Layout Dimensions



| Matching Components | | | | | | | | |
|---------------------|-------|-------|----|----|----|-------|-------|----|
| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Value | 1.2pF | 1.0pF | NA | NA | NA | 1.2nH | 1.0nH | NA |

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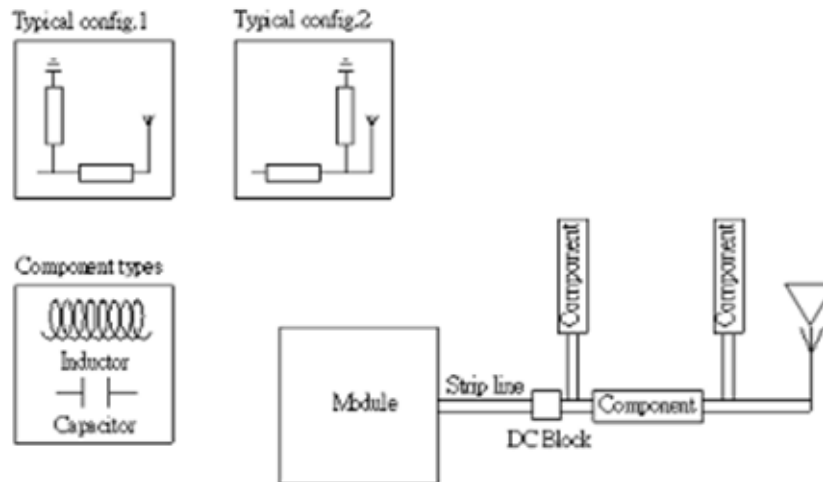


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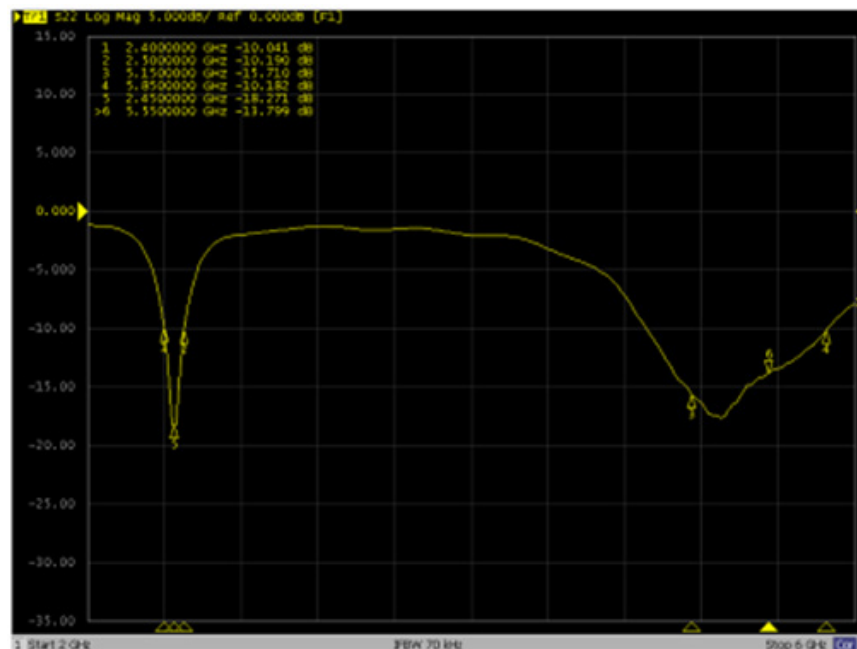
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Transmission Line Antenna Matching



Matching should be considered using a Pi network where 1, 2 or 3 components could be used. This shall be matched to the transmission line and the ground plane in the design.

Antenna Response – Return Loss S11



| Return Loss | 2400MHz | 2450MHz | 2500MHz | 5150MHz | 5550MHz | 5850MHz |
|-------------|----------|----------|----------|----------|----------|----------|
| S11 | -10.04dB | -18.27dB | -10.19dB | -15.71dB | -13.79dB | -10.18dB |

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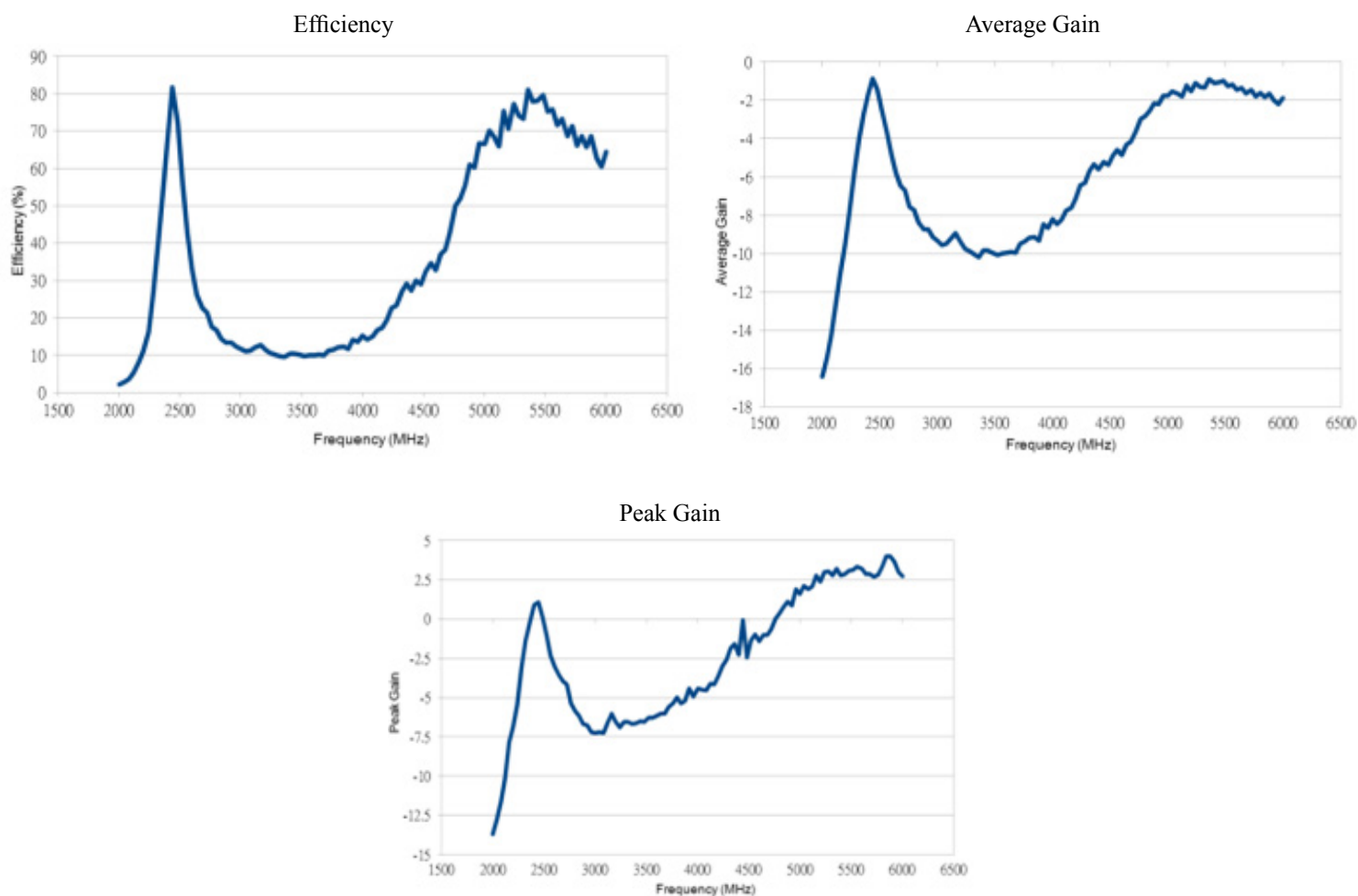


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Antenna Performance



| WLAN | 2400MHz | 2450MHz | 2500MHz | 5150MHz | 5850MHz |
|-------------------|---------|---------|---------|---------|---------|
| Efficiency (%) | 68.02 | 79.73 | 65.16 | 75.38 | 65.62 |
| Average Gain (dB) | -1.67 | -0.98 | -1.86 | -1.22 | -1.82 |
| Peak Gain (dB) | 0.88 | 1.05 | -0.19 | 2.56 | 4.01 |

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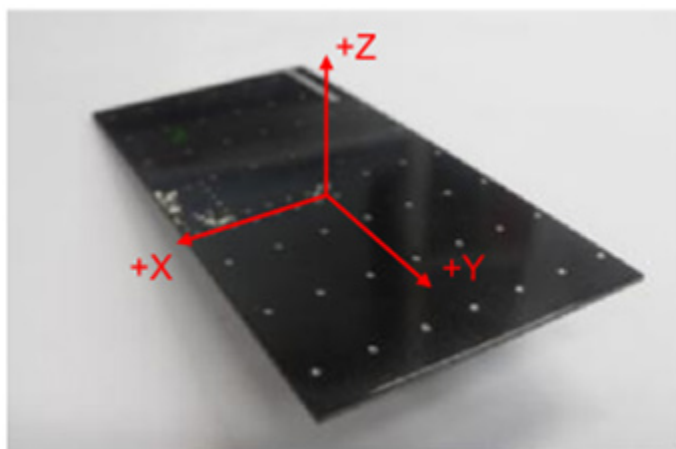
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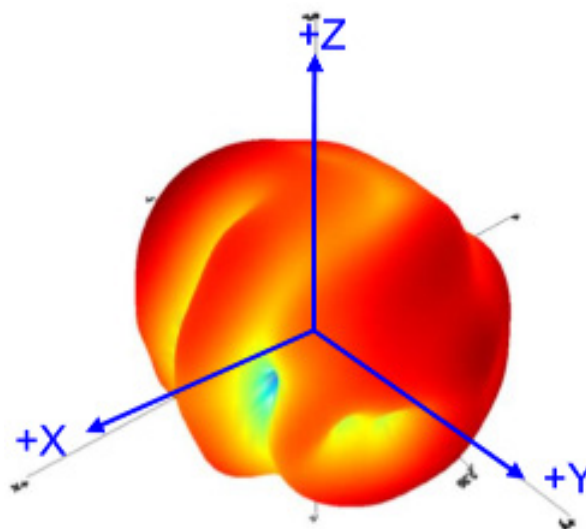
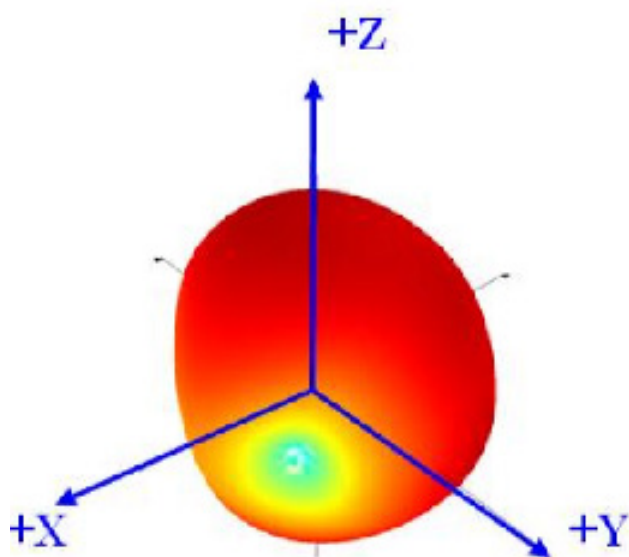
Antenna 3D Radiation Patterns – Evaluation Board

Coordinates



Radiation patterns 2450MHz (3D)

Radiation patterns 5550MHz (3D)



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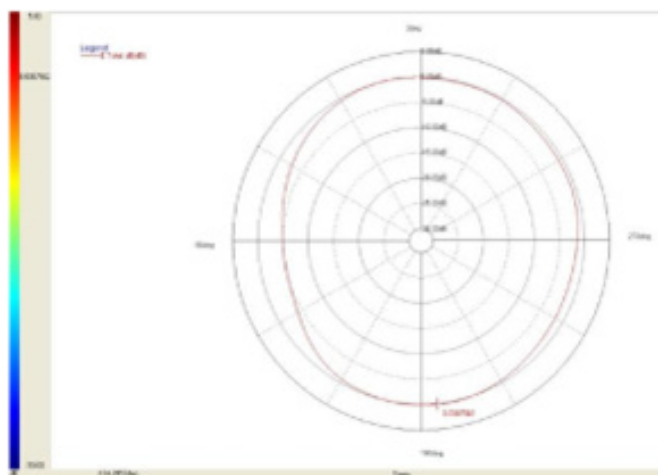
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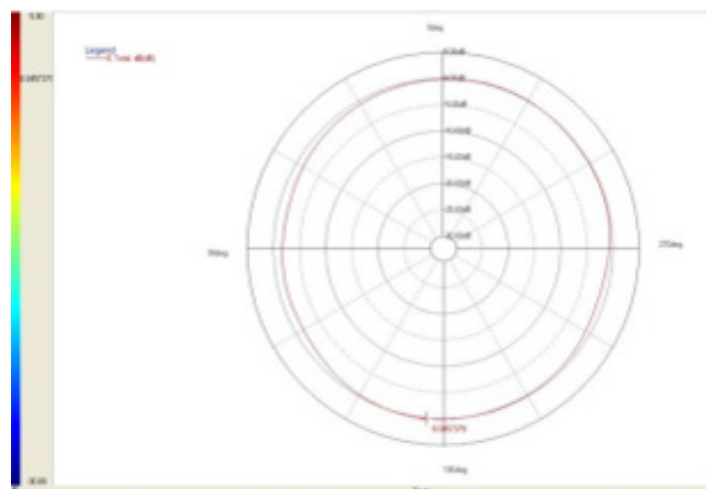
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Antenna 2D Radiation Patterns @ 2450MHz

2D Radiation Pattern X-Z Plane 2450MHz



2D Radiation Pattern Y-Z Plane 2450MHz



2D Radiation Pattern X-Y Plane 2450MHz



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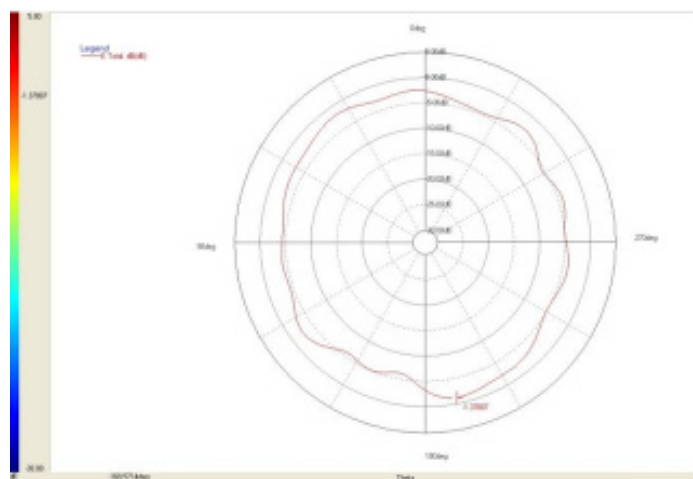
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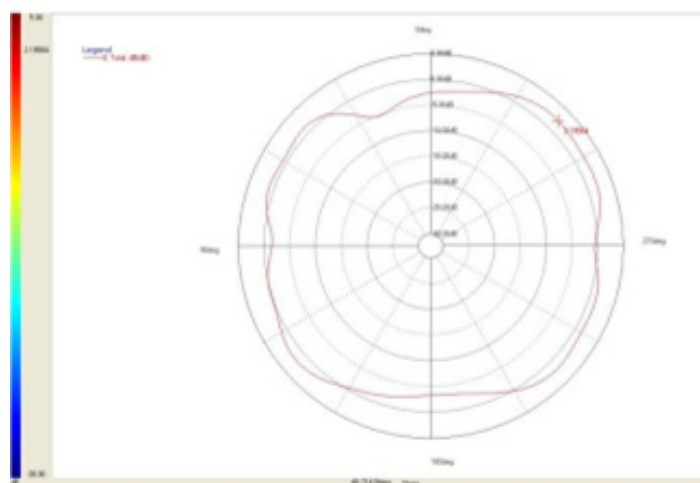
3.05 x 1.60 x 0.55 mm
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Antenna 2D Radiation Patterns @ 5550MHz

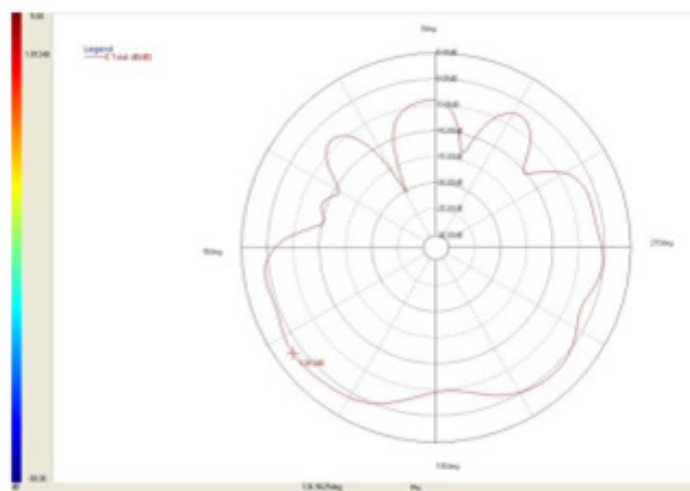
2D Radiation Pattern X-Z Plane 5550MHz



2D Radiation Pattern Y-Z Plane 5550MHz



2D Radiation Pattern X-Y Plane 5550MHz





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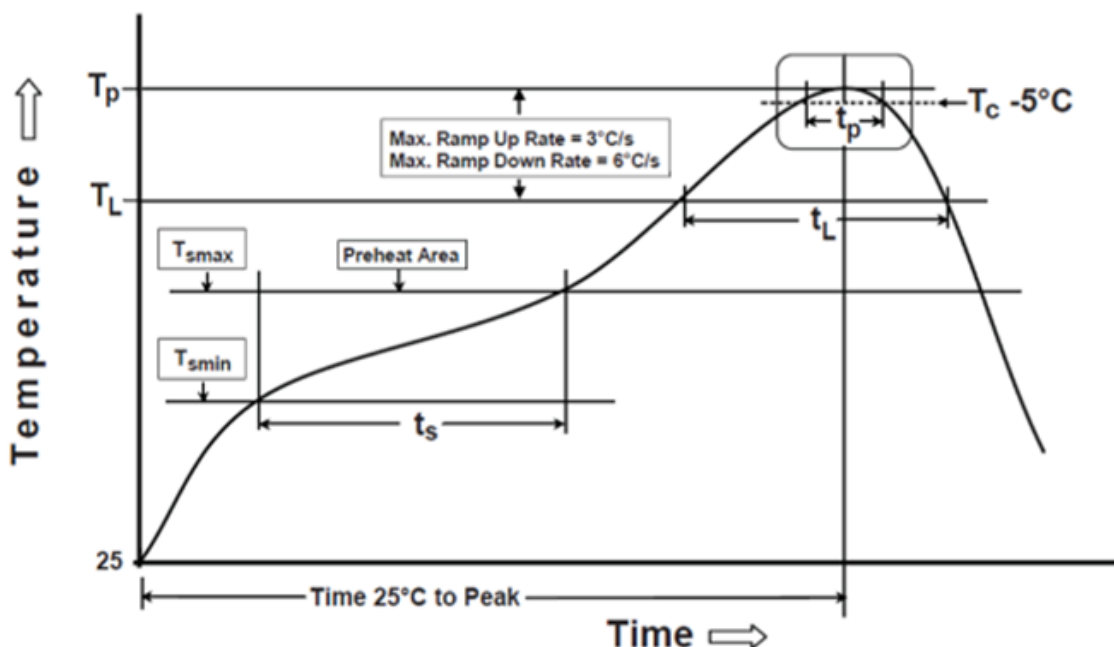
Reflow Soldering Standard Condition

Abrakon products can be assembled following Pb-free assembly.

According to the Standard IPC/JEDEC J-STD-020C, the temperature profile suggested is as follow:

| Phase | Profile Features | Pb-Free Assembly (SnAgCu) |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Pre-Heat | -Temperature Min (T _{smin}) -Temperature Max (T _{smax}) -Time (ts) from (T _{smin} to T _{smax}) | 150°C 200°C 60-120 seconds |
| Ramp-Up | Avg. Ramp-up Rate (T _{smax} to TP) | 3°C /second(max) |
| Reflow | -Temperature (TL) -Total Time above TL (t _L) | 217°C 30-100 seconds |
| Peak | -Temperature (TP) -Time (tp) | 260°C 5-10 second RAMP |
| Ramp-Down | Rate | 6°C / second max. |
| Time from 25°C to Peak Temperature | | 8 minutes max. |
| Composition of solder paste | | 96.5Sn/3Ag/0.5Cu |
| Solder Paste Model | | SHENMAO PF606-P26 |

Note : All the temperature measure point is on top surface of the component, if temperature over recommend, it will make component surface peeling or damage.



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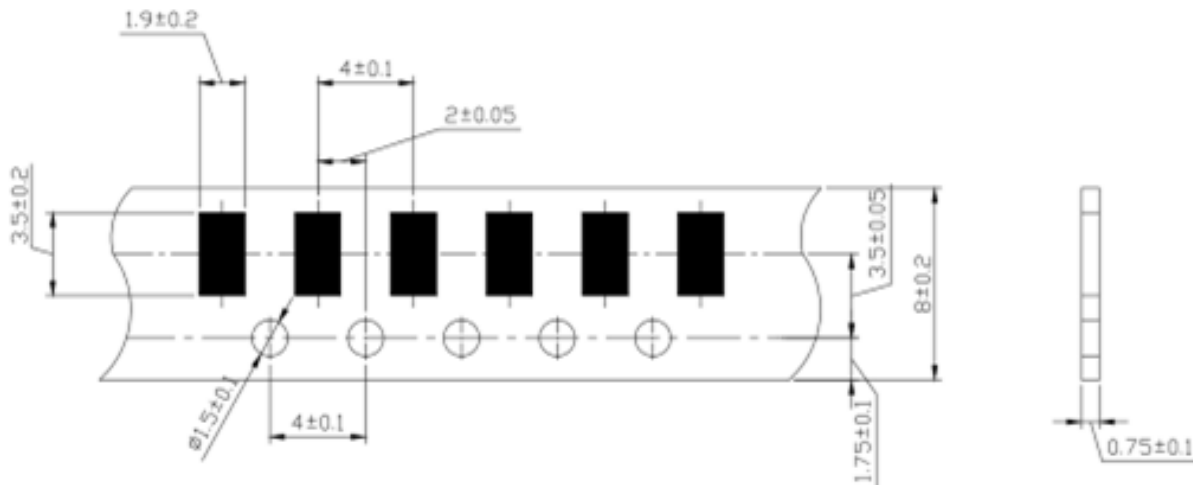
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Manual Soldering:

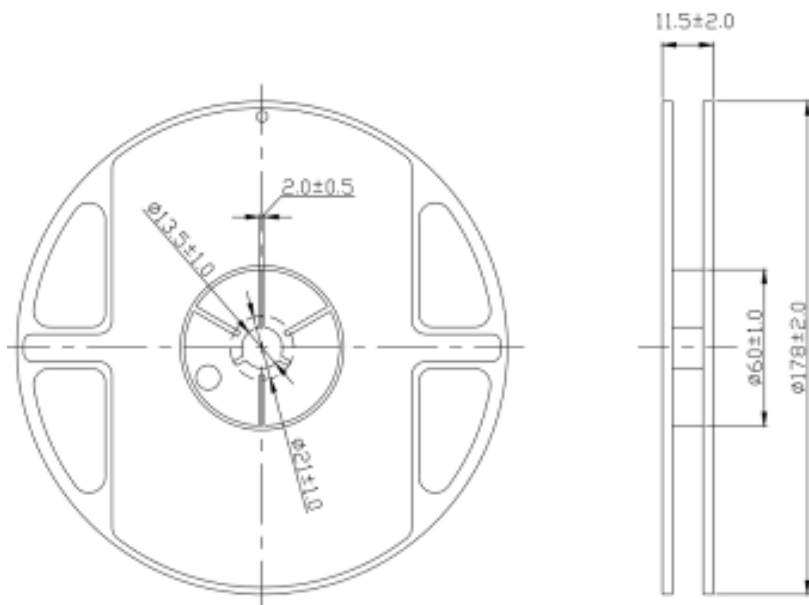
Soldering condition: Soldering iron temperature $270^{\circ}\text{C} \pm 10^{\circ}\text{C}$. Apply preheating at 120°C for 2-3 minutes. Finish soldering for each terminal within 3 seconds, if soldering iron over temperature $270 \pm 10^{\circ}\text{C}$ or 3 seconds, it will make component surface peeling or damage.

Packaging

Tape Dimensions (mm)



Reel Dimensions (mm)



1 Blister tape to IEC 286-3, polyester.
2 Pieces/tape: 5000

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